d.) REMARKS – General

Applicants have submitted a substitute specification and rewritten all claims to define the invention more particularly and distinctly to overcome the technical rejections and define the invention patentably over the prior art.

The Objection To The Preliminary Amendment Under 35 U.S.C. § 132

The preliminary amendment to the specification filed on 29 April 2002 and on 30 June 2003 was objected to under § 132 since it was said to introduce new matter into the disclosure of the invention. The added material, which is not supported by the original disclosure is as follows: The changes made to Figures 1A, 2A, and 3A (filed on 30 June 2003) constitute new matter (the addition of drive shaft 21, electrical motor 27a, and drive gear 25a). In the preliminary amendment of 29 April 2002, items 2-7 and 9-11 (i.e., amendments to the specification) contain references to one or more of drive shaft 21, electric motor 27a, and driving gear 25a, which are not supported by the originally-filed specification and which constitute new matter. In the preliminary amendment of 29 April 2002, items 8-10 (i.e., amendments to the specification) contain the expression "rotated in opposite directions", which are not supported by the originally-filed specification and which constitute new matter.

Applicants respectfully request reconsideration and withdrawal of this objection for the following reasons:

The amendments were a correction of simple errors, i.e., in Figures 1A, 2A, and 3A of the originally-filed application, winding flyer 22 and unwinding flyer 24 are rotated by electric motor 27 in the same direction resulting in that unwinding flyer 24 cannot unwind the leading fiber loops at the delivery ends of the conveyer-drawing members. To be an "unwinding flyer" flyer 24 has to rotate in the direction opposite to the direction of rotation of winding flyer 22. The originally-filed specification explicitly teaches this aspect of the invention naming these flyers "winding" and "unwinding" throughout the specification including description of the operation of the embodiments of Figures 1A, 2A, and 3A. The following examples support this statement.

1. Section "Brief Summary of the Invention" states: "The controlled fiber loops are continuously laid around the receiving ends of the moving conveyer-drawing members by a fiber winding flyer, which rotates about the central axis" (line 14 of page 10) and "At the delivery ends, leading loops of the drawn fiber are successively removed by a take-off device comprising a fiber unwinding flyer which rotates about the central axis" (line 26 of page 10).

2. Table "Reference Numerals in Drawings" names items 22 and 24 as fiber winding and fiber unwinding flyers respectively (page 16).

3. Section "Figs. 1A-1C – One Embodiment" states: "The feed device comprises a pair of driven feed rollers 26, a fiber winding flyer 22, an outlet 22a, ..." (line 20 of page 18) and "The take-off device comprises a pair of driven conveying rollers 28, a roller 28', a weight 30, an fiber unwinding flyer 24, an inlet 24a, ..." (line 29 of page 18).

4. Section "Figs. 1A-1C – Operation" states: "The leading fiber loops are continuously unwound by flyer 24 at the deliver ends of spindles 54" (line 21 of page 20).

For a person of ordinary skill in the art it would be obvious that the embodiments of Figures 1A, 2A, and 3A of originally-filed specification cannot operate as described by the specification unless winding flyer 22 and unwinding flyer 24 rotate in opposite directions.

In regards to the alleged new matter, applicants respectfully submit that the changes made were in accordance with proposed amendments mentioned to the Examiner in a May 13, 2002 meeting with the Examiner with one of the inventors, Leonid Slutsker. During this meeting, applicant discussed the first preliminary amendment filed April 29, 2002 and presented the Examiner with proposed amendments to Figures 1A, 2A, and 3A, and specifically the addition of drive shaft 21, electrical motor 27a, and drive gear 25a. Applicant explained that the amendments were to correct simple errors and did not result in any changes to the claims and that the errors were made without deceptive intent. The Examiner agreed during this meeting that these proposed amendments did not introduce new matter. As such, applicants are confused as to the reasons

why these proposed amendments, which that the Examiner agreed did not contain new matter, are now held to allegedly introduce new matter. Again, as applicants respectfully submit that these amendments were made to correct simple errors and that these errors were made without deceptive intent, applicants respectfully submit that no new matter was added by these amendments and respectfully request withdrawal of this rejection.

The Rejection of Claims Under 35 U.S.C. § 112

Claims 11, 15, 32, 36, 53, and 57 were rejected under § 112, first paragraph, since it was said to fail to comply with the written description requirement. The claims contain subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In each of these claims, the expression "contact points between the fibers and the spindles (or rollers) being not permanent" does not have support in the originally-filed specification and thus, constitutes new matter.

(Applicants assume that the Examiner rejected the amendments to claims 11, 15, 32, 36, 53, and 57 in the preliminary amendment filed on 30 June 2003 rather than the original claims because the expression "contact points between the fibers and the spindles (or rollers) being not permanent" is not a part of original claims and is an amendment under section "e" (Remarks/Arguments), part "In the Claims", item 3).

Applicants respectfully request reconsideration and withdrawal of this objection for claims 11, 15, 32, 36, 53, and 57 (rewritten claims 69, 72, 79, and 82) since the originally-filed specification supports these amendments to the claims as follows:

1. Section "Brief Summary of the Invention" (line 19 of page 10) states: "Preferably, the fiber coil is slowly rotated about the central axis preventing the fiber loops from having permanent contact points with the conveyer-drawing members".

2. Section "Figs. 1A-1C – Operation" (line 15 of page 20) states: "Both flyers 22 and 24 make one revolution while spindles 54 make one revolution. As this takes place, each fiber loop travels along the central axis one pitch of the fiber coil. Simultaneously the fiber coil is slowly rotated about the central axis, and each point of the fiber loop passes along the loop circumference a distance equal to a spindle circumference (measured at inner diameter of the thread or spiral groove)..... The fiber does not have permanent contact points with the spindles. This provides the uniformity of the dimensions and physical properties of the drawn fiber".

For one skilled in the art it is obvious that in the embodiment of Fig. 1A the rotating spindles rotate the fiber loops about the central axis. To define this aspect a little bit clearer, applicants made an amendment in this paragraph – that is, "Simultaneously the fiber coil is slowly rotated about the central axis by the rotating spindles, and each point of the fiber loop passes along the loop circumference a distance equal to a spindle circumference (measured at inner diameter of the thread or spiral groove)"

3. Section "Figs. 2A-2D -- Another Embodiment" states: "As shown in Figs. 2A and 2B, sections 66, 66a, and 66b pass over double guide chain wheels 68' so that the delivery end of each chain section overlaps with the receiving end of the next chain section. Since adjacent receiving and delivery ends are circumferentially spaced, they support different portions of the fiber loops moved by the circulating chains along the central axis (line 1 of page 22) and "This changes contact points between the fiber and the fiber displacing members thus resulting in better uniformity of dimensions and physical properties of the drawn fiber" (line 7 of page 22).

4. Section "Figs. 3A - 3G – Operation" (line 29 of page 23) states: "At the same time gears 84 rotate gears 86 and long gears 90 (Figs. 3E and 3F). Gears 90 rotate gears 100 and rollers 98 while rollers 98 are moved by chains 80 from the receiving ends, along gears 90, to the delivery ends.... As the fiber loops travel to the left along the central axis, as viewed in Fig. 3A, the fiber coil is rotated about the central axis by rollers 98. This changes contact points between the fiber and the rollers thus resulting in a better uniformity of dimensions and physical properties of the drawn fiber".

In order to define this aspect of specification a little bit further, applicants made an amendment to this paragraph – that is, "As the fiber loops travel to the left along the central axis, as viewed in Fig. 3A, the fiber coil is rotated about the central axis by rotating rollers 98".

Applicants respectfully submit that the originally-filed specification supports the expression "contact points between the fibers and the spindles (or rollers) being not permanent" in the amendment in such a way that it is obvious to one skilled in the art how the embodiments of the invention are constructed and arranged to provide that effect, and, therefore, this expression doesn't constitute new matter. Applicants respectfully submit that the amendment does comply with § 112 and therefore respectfully request withdrawal of this objection.

All Claims are Commonly Owned by Inventors

Applicants confirm that the subject matter of all claims in originally-filed applications and amendments are commonly owned by inventors at the time any inventions covered therein were made.

The Rejection of Claims 1-16, 18, 19, 21-37, 39, 40, 42-58, 60, 61, 63, and 64 Under 35 U.S.C. § 103(a)

Claims 1-16, 18, 19, 21-37, 39, 40, 42-58, 60, 61, 63, and 64 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Sordelli (U.S. Patent 2,302, 508) since it was said to fail to comply with the requirement of being unobvious, i.e., although Sordelli does not explicitly teach the aspect of the apparatus constructed to provide a ratio of fiber outlet speed (V_{outlet}) to a fiber speed in the drawing process $(V_{fiber})_{max}$ greater than 1 (or greater than 1 to 1, as put in our originally-filed application), such an aspect would have been obvious to one of the ordinary skill in the art at the time the invention was made in view of Sordelli because the apparatus of Sordelli, like the instant apparatus, draws the fiber by expanding the circumference of fiber loops while conveying the fiber loops along conveyer-drawing members.

Applicants have rewritten all claims to define the invention more particularly and distinctly to overcome the technical rejections and define the invention patentably over Sordelli.

Applicants respectfully request reconsideration of this rejection, as now applicable to new claims 67 to 86 for the following reasons:

Our invention, as claimed, distinguishes over Sordelli.

1. Our invention provides different solution for drawing and conveying of the fiber loops as compared with the Sordelli's apparatus. In particular, in our invention, the conveyer-drawing members are different, i.e., (a) they are either circulating flexible endless members (like chains, cables, belts, bands, cords, and escalator-type moving stairs) or rotating spindles with thread or spiral groove;(b) they are not cantilever but two-side supported; and (c) they are positioned at a divergence angle α to the central axis in such a way that their both receiving and delivery ends are spaced along the central axis – that is, they are not skewed with respect to the central axis but lay in plane with the central axis.

Sordelli's apparatus has different and more complex design, i.e., it has smooth-surface, cantilever rotating rollers, as conveyer-drawing members, diverged and skewed with respect to the central axis.

2. In our invention, the fiber drawing apparatuses have a stationary or instant conveyer-drawing structure, which does not rotate about the central axis. The fiber is wounded and unwounded by the winding and unwinding flyers rotating about the central axis.

Sordelli's apparatus is more complex, i.e., it has whole conveyer-drawing structure, including the cantilever, diverged, and skewed conveyer-drawing members, rotating about the central axis. The fiber winding and unwinding come from the rotation of the conveyer-drawing structure.

3. In our invention, the fiber draw ratio can be adjusted by adjusting a divergence angle of the conveyer-drawing members.

Sordelli's apparatus has a fixed divergency of the conveyer-drawing members and is not capable to change the fiber draw ratio, if it is necessary, by changing the divergency.

4. In our invention, there are fiber-displacing members facilitating fiber drawing and conveying along the central axis. In case of the endless rotating chains and other flexible conveyer-drawing members, these fiber-displacing members are rollers, semi-rings, plates, rods, and pins mounted on the conveyer-drawing members. In case of the rotating spindles, they are threads or spiral grooves. The fiber loops cannot slide down along conveyer-drawing members because they are supported by these fiber-displacing members. Thus, the conveyer-drawing members do not need rubber or any other coating to prevent this type of problem and can operate inside a heat chamber.

In Sordelli's apparatus, the conveyer-drawing members (rollers) do not have the fiber-displacing members. They have smooth surface covered with rubber or other materials to improve friction and to prevent sliding down of the fiber loops on the surface of the members. In this case, it would be difficult to find the coverage that can operate inside a heat chamber at elevated temperatures required for effective hot drawing of the fibers. Without the coverage, it is quite possible that the loops will slide down the conveyer-drawing members (especially in case of the higher divergency required for higher draw ratios, or some polymers with lower friction coefficient, or some finishes applied in the fiber making process).

Thus, our invented apparatus has substantially different and simpler design in comparison with Sordelli.

Our invention is not obvious in view of Sordelli.

Our invented method and apparatus would not have been obvious to one of ordinary skilled in the art at the time the invention was made in view of Sordelli that is supported by the following arguments:

1. Our invention has achieved unexpected and superior results in comparison with Sordelli:

   a. In our invention, the drawing apparatus can draw larger number of the fiber loops (up to a few hundred) because its non-cantilever and unskewed conveyer-drawing members can: (i) generate and sustain high drawing forces while drawing large number of the fiber loops and (ii) be designed as long as necessary to place large number of the fiber loops. The conveyer-drawing structure can have the divergence angle for the conveyer-drawing members and diameter (and a circumference L) of the leading fiber loop at the delivery ends as large as necessary that is important to provide high draw ratios (5x and higher) as well as high outlet speed V_{outlet} (see page 59).

      In case of Sordelli, the conveyer-drawing members (which are cantilever, diverged, and skewed with respect to the central axis) are not as strong as non-cantilever and unskewed ones to generate and sustain high drawing forces while drawing large number of the fiber loops (up to a few hundreds) [especially in case of high draw ratios (e.g., 5x and higher), high denier filaments, and present-day high tenacity fibers]. For the same reasons, Sordelli's apparatus has limitation of being long to place large number of the loops. Sordelli's apparatus has also limitation in providing high divergency of the conveyer-drawing members and diameter of the leading fiber loop at the delivery end (required for high draw ratios, i.e., 5x and higher) because of (i) design of the driving mechanism (gear box) for driving the conveyer-drawing members and (ii) possibility of sliding down of the fiber loops along the conveyer-drawing members.

      Due to the capability to draw larger number of the loops, our invention can provide:

      - Substantially longer drawing time (up to a few tens of seconds) and lower strain rate (as low as a few %/sec), other conditions being equal (including speed of the fiber loops along the central axis V_{loop} and outlet speed V_{outlet}), and

      - Substantially higher outlet speed V_{outlet} in case when our and Surdelli's apparatuses provide the same drawing time and strain rate. To provide the same

drawing time while drawing larger number of the loops, our method provides higher V_{loop}. According to equation (9) in the originally-filed application, outlet speed V_{outlet} is given by

$$V_{outlet} = (V_{loop} \cdot L)/d$$

Thus, our invention provides substantially higher speed V_{outlet} because of higher speed V_{loop} and larger circumference L of the leading loop at the delivery end (see page 58) providing that the distance between adjacent loops d is the same.

b. Our method and apparatus are operator-friendly, especially in case of the embodiment with the circulating chains (Fig. 3A). For this embodiment, (i) in case of fiber breakage, the chains convey the broken ends to their delivery ends where an operator can easily handle them and (ii) loading the fiber end into the apparatus to start the drawing process is semi-automatic and includes the following seven steps. (1) The apparatus is turned off. (2) The fiber end is sucked in by the air gun through the channels in the central shaft and the winding flyer and fastened to one of the displacing members (e.g., a roller or semi-ring). (3) Driving mechanism is turned on, and the apparatus automatically loads successive coiled fiber loops (possibly a few hundreds of them) on the conveyer-drawing members from the receiving to delivery ends. (4) The apparatus is turned off. (5) The fiber end is sucked in by the air gun through channels in the central shaft and the unwinding flyer. (6) the apparatus is turned on. (7) The fiber is taken up.

In this respect, Sardelli's apparatus is not operator-friendly, i.e., it is difficult to load the fiber end into the apparatus to start the drawing process as well as to restart the apparatus after fiber breakage. In case of fiber breakage, the rotating rollers can turn the broken ends around themselves causing a substantial problem.

Thus, based on all arguments discussed above, Sordelli's apparatus has substantial problems that prevented its commercial usage. On the other hand, our invention solves these problems and, therefore, is feasible for the industrial application. Moreover, the invention is capable to solve long-existing but unsolved problems of the fiber industry (see page 60).

2. Our invention solves three long-felt, long-existing but unsolved challenging needs of the fiber industry. They are as follows:

(1) Manufacturing a new generation of polymer fibers with superior tensile properties close to those made by lab-scale experiments (low-fiber-speed, low-drawing-speed, long-drawing-time) by high-throughput commercial industrial process. In case of lab-scale, melt-spun, flexible-chain polymer fibers, tenacity is higher by factor of 1.5-2.0, initial modulus is several times higher, and intermediate moduli are substantially higher (stress-strain curve is substantially straighter) than those for conventional commercial fibers;

(2) Filling the gap between two extremes, i.e., (i) low-performance, low-cost polymer fibers, such as polyethylene, polypropylene, polyester, nylon, etc. and (ii) high-performance, high-cost fibers, such as Kevlar® , Twaron® , Spectra® and Dyneema®. To accomplish this, a new generation of low-cost, high-performance polymer fibers is to be developed (most likely flexible-chain, regular-molecular-weight, melt-spun, manufactured by high-throughput commercial process) with substantially improved physical properties (lying somewhere in between these two extremes). This can be done by introducing results of the lab-scale research efforts (mentioned above) to the industry resulting in fibers with tenacity of about 1-2 GPa (12-22 gpd) and initial tensile modulus of about 20-100 GPa (250-1000 gpd) (for different flexible-chain polymer fibers with different theoretical values of tensile properties) as well as high intermediate moduli (straighter stress-strain curve); and

(3) Manufacturing polymer fibers with both high dimensional stability (low hot-air shrinkage) and high tensile properties mentioned above by continuous high-throughput commercial industrial process without using expensive and energy-consuming additional heat-setting equipment.

Applicants have built a prototype of the invented apparatus (see three pictures

attached) and proved that the invention is capable to accomplish thee great challenges mentioned above (page 32, Experiment -- Drawing of Polypropylene Fibers). Applicants generated regular-molecular-weight, melt-spun polypropylene fibers with tensile and shrinkage properties close to those of lab-scale fibers and superior relative to commercial fibers. Applicants achieved tenacity 0.9–1.2 GP (11-14.5 gpd), initial modulus 18-20 GPa (215-250 gpd), breaking elongation 8-10 %, hot-air shrinkage 0-3 % (at 132 °C), and high intermediate moduli (straighter stress-strain curve) (page 36, Table V; Fig. 7). The fibers were drawn at long drawing time T (tens of seconds), low fiber speed $(V_{fiber})_{max,}$ (lower than 0.6 m/min) and low strain rate V_{strain} (1-4 %/sec) which the invention can provide in high-throughput industrial process.

Up to now those skilled in the art thought or found these great challenges, solved by the invention, were insoluble – that is, our invention converts failure to success. The failures of prior-art workers indicate that a solution was not obvious. If the invention were in fact obvious, because of its advantages, those skilled in the art surely would have implemented it by now. To the best of our knowledge, the American, Japanese, and European fiber industries have so far achieved no progress in this area. The fact that those skilled in the art have not implemented the invention, despite its great advantages, indicates that it is not obvious.

Applicants are in contact with a number of American, European, and Japanese fiber companies (e.g., DuPont, Invista, KoSa, Honeywell, Teijin, DSM, Drake Extrusion, and others) regarding licensing of this technology. All of them found this technology unknown, new and promising and are in the process of its further evaluation.

3. Sordelli's invention lacks any suggestions that it should be modified in a manner required to meet the claims of our invention.

Thus, applicants respectfully submit that the claims do comply with § 103(a) and therefore respectfully request withdrawal of this objection.

In Conclusion the Examiner notes that in the preliminary amendment of 30 June 2003, under section "e" (Remarks/Arguments), applicants list items 1-6 of purported amendments. However, these amendments (i.e., items 1-6) are not in the instant application and thus, these amendments have not been made.

These amendments have been made in the substitute specification of 30 June 2003 but in section "e" (Remarks/Arguments) their places in the text were indicated with numbers of paragraphs and lines in the originally-filed specification which created difficulties in locating them in the substitute specification. Applicants submit them again in this reply to the Office Action (see below). Applicants consider that amendments of item 7 of section "e", part "In the Specification" (Remarks/Arguments) (i.e., combining drawings 7a and 7b in one drawing 7 and adding typical stress-strain curve for polypropylene fibers), as well as minor amendments of item 8 of the same section (i.e., ~~%/s~~ %/sec, ~~patent~~ Pat. No., correction of the literature references, ~~gm/denier~~ gpd, and grammar errors) are allowed. Thus, these amendments are not marked (underlined and/or crossed out) in the substitute specification.

Amendments to Specification and Drawings

1. The paragraph beginning at line 10 of page 2 has been amended to clarify the definition of the coiled fiber loops according to the dictionary (see attached copy of the dictionary pages on definition of word *coil*).

2. The paragraph beginning at line 4 of page 10 has been amended according to the definition of the coiled fiber loops mentioned above.

3. The paragraphs beginning at line 1 of page 13, line 29 of page 31, and line 13 of page 37 have been amended, i.e., ratio 6000 to 1 was corrected and replaced by ratio 9000 to 1 according to results of calculations presented in Table I (line 10) of the originally-filed specification. Thus,

this amendment is supported by the originally-filed specification and does not introduce new matter.

4. The paragraphs beginning at line 29 of page 20 (continued on page 21) and at line 17 of page 23, Table I of page 31, and Table II of page 32 have been amended because of minor errors.

5. Part of the originally-filed specification has been canceled, i.e., (i) line 31 of page 25, (ii) line 8 through line 23 of page 29, and (iii) entire Example 3 on pages 30, resulting in amendments of the paragraph beginning at line 29 of page 31 (lines 30, 32, and 34) , the footnotes of Tables I and II (pages 31 and 32), and the Appendix (the designation of $D_{spindle}$). These amendments have been done because of simple errors, i.e., fiber speeds V_{fiber} and $(V_{fiber})_{max}$, according to their definition (line 24 of page 2, line 2 of page 13, and Appendix on page 43), are speeds of the fiber points in the drawing process and therefore do not have a component from the rotation of the fiber loops about the central axis $V_{rotation}$.

6. The application drawing Fig. 6 and the paragraph beginning at line 12 of page 27 have been amended because of a simple error, i.e., according to the originally-filed specification the fiber loops are rotated about the central axis by rotating rollers (line 6 of page 24,) or spindles (see Remarks, part "b" , section "The Rejection of Claims Under 35 U.S.C. § 112", page 53). Thus, a linear speed $V_{rotation}$ is a linear surface speed of the rotating rollers or spindles and cannot be perpendicular to radiuses OP or OK in Fig. 6 but it goes along the fiber sections between the adjacent conveyer-drawing members. Applicants submit new (corrected) drawing Fig. 6 to substitute for the original drawing Fig. 6.

7. In a few places, the words "controlled fiber loops" and "controlled loops" have been replaced by words "coiled fiber loops" or "coiled loops" respectively (pages 8, 10, 17, 20, 22, 24, and 40) that corresponds to the title of the patent application and maintains consistency with the rest of the originally-filed specification (see, for example, lines 6, 17, and 24 of page 10, lines 7 and 10 of page 17, line 11 of page 20, line 3 and 13 of page 24)..

8. A few paragraphs has been added on pages 8 and 9 regarding the invention of Sardelli.

9. The paragraphs beginning at line 15 of page 20, line 12 of page 27, lines 27 of page 29, and line 4 of page 30 of page 30, the caption for Fig. 6 at page 14, and Appendix (the designations for L_{fiber}, L_{total}, and $V_{rotation}$) have been amended to clarify that the fiber loops are rotated about the central axis by rotating rollers or spindles, and the linear speed of each point of the loops in process of the rotation $V_{rotation}$ equals the linear surface speed of the rollers or spindles. It is supported by the originally-filed specification. In case of the rotating rollers, the paragraph beginning at line 27 of page 23 states: "....Gears 90 rotate gears 100 and rollers 98 while rollers 98 are moved by chains 80 from the receiving ends, along gears 90, to the delivery ends..... As the fiber loops travel to the left along the central axis, as viewed in Fig. 3A, the fiber coil is rotated about the central axis by rollers 98". Thus, this paragraph teaches that he fiber coil is rotated about the central axis by rotating rollers 98. In case of the rotating spindles, the paragraph beginning at line 15 of page 20 states: "Both flyers 22 and 24 make one revolution while spindles 54 make one revolution. As this takes place, each fiber loop travels along the central axis one pitch of the fiber coil. Simultaneously the fiber coil is slowly rotated about the central axis, and each point of the fiber loop passes along the loop circumference a distance equal to a spindle circumference (measured at inner diameter of the thread or spiral groove)". Thus, this paragraph teaches that the rotating spindles rotate the coiled fiber loops about the central axis. From these two paragraphs, it is obvious that the coiled fiber loops rotate with the linear speed of each point of the loops $V_{rotation}$ equals the linear surface speed of the rollers or spindles. Thus, applicants respectfully submit that this amendment is supported by originally-filed specification and does not introduce new matter.

10. Amendments have been made through the specification to maintain consistency in designation of time and temperature, i.e., time has been designated by letters "T" and "ΔT" and temperature has been designated by letter "t".

11. Amendment has been made through the specification, i.e., words "aliphatic" have been replaced with words "flexible-chain" (pages 4, 6, 11, 12, 38, and 39) to correct inaccuracy and maintain consistency. The originally-filed specification supports this amendment. In the paragraph beginning at line 10 of page 6, polymer fibers made of different polymers including polyethylene, polypropylene, polyester, nylon and etc., were designated as aliphatic polymer

fibers that is not correct. Polyester is not aliphatic but flexible-chain polymer. Polyethylene, polypropylene, nylon are both aliphatic and flexible-chain polymers. Thus, it is correct to name this group of polymer fibers as a group of flexible-chain polymer fibers rather than aliphatic ones. Applicants submit that the amendment is supported by the originally-filed specification and does not introduce new matter.

12. Amendment has been made on pages 28 (lines 1 and 8) and 46 (Appendix, lines for N') to clarify the definition of numbers of the fiber loops (N - N') and N'.

13. The rest amendments in the specification are minor changes, corrections, and clarifications.

Conclusion

For all of above reasons, applicants submit that the specification and claims are now in proper form, and the claims all define patentably over the prior art. Therefore they submit that this application is now in condition for allowance, which action they respectfully solicit.

Conditional Request for Constructive Assistance

Therefore it is submitted that patentable subject matter is clearly presented. If the Examiner agrees but does not feel that the present claims are technically adequate, applicants respectfully request that the Examiner write acceptable claims pursuant to MPEP 707.07(j).

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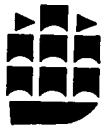

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another wheel —see picture at MACHINERY **2 cog in the machine** *infml* an unimportant person or branch of a firm in a very large business or organization: *I didn't want to be just a cog in the machine so I started my own business and now find work much more interesting*

co-gen-cy /'kəʊdʒənsi/ *n* [U] the power to prove or produce belief; quality of being COGENT: *The cogency of the priest's arguments made me believe in God*

co-gent /'kəʊdʒənt/ *adj* having the power to prove or produce belief; forceful in argument; CONVINCING: *I have cogent reasons for voting for the workers' party* —**~ly** *adv*

cog-i-tate /'kɒdʒɪˌteɪt‖'kɑ-/ *v* [I∅ (*about, on, upon*)] *fml* to think carefully and seriously about (something)

cog-i-ta-tion /ˌkɒdʒɪ'teɪʃən‖ˌkɑ-/ *n* [U *often pl. with sing. meaning*] *fml* the act of thinking carefully and seriously

co-gnac /'kɒnjæk‖'kəʊ-, 'kɑ-/ *n* [C;U] (a glass of) a type of fine strong alcoholic drink (BRANDY) made in Southwestern France

cog-nate[1] /'kɒgneɪt‖'kɑg-/ *adj* [(*with*)] **1** *tech* related in origin: *Italian and Spanish are cognate languages* **2** *fml or tech* related; sharing many qualities: *Do you think chemistry is cognate with any other science?*

cognate[2] *n tech or fml* a person or thing related in origin or having much in common with another

cog-ni-tion /kɒg'nɪʃən‖kɑg-/ *n* [U] *tech or fml* the act or action of knowing, including consciousness of things and judgment about them

cog-ni-tive /'kɒgnɪtɪv‖'kɑg-/ *adj* [Wa5] *tech or fml* of, about, or needing COGNITION: *cognitive* PSYCHOLOGY (1,2) —**~ly** *adv*

cog-ni-zance /'kɒgnɪzəns‖'kɑg-/ *n* **take cognizance of** *fml or law* to take notice of; take into consideration: *The judge has taken cognizance of the new facts in your case*

cog-ni-zant /'kɒgnɪzənt‖'kɑg-/ *adj* [F+*of*] *fml or law* conscious; AWARE: *The judge said he was not cognizant of the case*

cog-no-men /kɒg'nəʊmən‖kɑg-, 'kɑgnə-/ *n* **1** *tech* a person's family name (SURNAME), esp. the 3rd and usu. last name of an ancient Roman citizen **2** *pomp* any name, esp. a descriptive NICKNAME

co-gno-scen-ti /ˌkɒnjəʊ'ʃenti:‖ˌkɑnjə-/ *n* [(*the*) P] *It* people with very good knowledge of or experience in fashion, art, food, etc.; CONNOISSEURS

cog-wheel /'kɒg-wi:l‖'kɑg-/ *n* a toothed wheel (wheel with teeth (COGS) round the edge) that can move or be moved by another wheel of the same type

co-hab-it /ˌkəʊ'hæbɪt/ *v* [I∅ (*with*)] *tech or fml* (of one or more unmarried people) to live as a married person or married people: (fig.) *Can peace and freedom cohabit in the modern world?* —**~ation** /kəʊˌhæbɪ'teɪʃən/ *n* [U]

co-here /kəʊ'hɪə[r]/ *v* [I∅] **1** to stick together; be united **2** to be reasonably and naturally connected, esp. in thought: *Do his religious and political beliefs cohere?*

co-her-ence /kəʊ'hɪərəns/ also **co-her-en-cy** /-rənsi/— *n* [U] natural or reasonable connection, esp. in thoughts or words; CONSISTENCY[1]

co-her-ent /kəʊ'hɪərənt/ *adj* (esp. of speech, thought, ideas, etc.) being naturally or reasonably connected; easily understood; CONSISTENT —**~ly** *adv*

co-he-sion /kəʊ'hi:ʒən/ *n* [U] **1** the act or state of sticking together tightly: *We need more moral cohesion if we're to defeat the enemy* **2** (in science) the force which holds parts of a solid or liquid together

co-he-sive /kəʊ'hi:sɪv/ *adj* **1** producing COHESION: *cohesive forces in society* **2** *tech* tending to stick together: *Is water cohesive by nature or not?* —**~ly** *adv* —**~ness** *n* [U]

co-hort /'kəʊhɔ:t‖-hɔrt/ *n* **1** (in the ancient Roman army) a group of between 300 and 600 soldiers under one commander, being a 10th part of a LEGION **2** any group or company of people, esp. soldiers joined together **3** *often derog esp. AmE* a companion: *That criminal and all his cohorts must be brought to justice*

coif /kɔɪf/ *n* a close-fitting cap covering the top, sides, and back of the head, worn, esp. in former times by both men and women and today by some NUNS (=members of female religious groups) under their VEILS (=long loose head coverings)

coif-feur /kwɒ'fɜ:[r]‖kwɑ-/ *n fml* HAIRDRESSER

coif-fure /kwɒ'fjʊə[r]‖kwɑ-/ *n* a style of arranging and combing a woman's hair —**fured** *adj*

coil[1] /kɔɪl/ *v* [T1 (UP; L9, esp. UP)] to (cause to) wind or twist into a ring or continuous circular shape (SPIRAL): *Will you coil the rope up please.|The snake coiled (itself) around the tree|coiled itself into a ball|coiled up*

coil[2] *n* **1** [C] a connected set of rings or twists into which a rope, wire, etc., can be wound; continuous circular shape made by winding rope, wire, etc.: *a coil of rope* **2** [C] a single one of these rings or twists: *a loose coil of hair* **3** [C] *tech* an electrical apparatus made by winding wire into a continuous circular shape, used for carrying an electric current —see picture at CAR **4** [C; *the*+R] a plastic or metal object fitted inside a woman to prevent her having more children; INTRAUTERINE DEVICE

coin[1] /kɔɪn/ *n* **1** [C] a piece of metal, usu. flat and round, made by a government for use as money **2** [*in/with*+U] such pieces in number: *He paid me in coin* **3 pay someone in his own/the same coin** *infml* to treat someone as he has treated others

coin[2] *v* [T1] **1** to make (metal) into coins **2** to make (coins) from metal: *The government has decided to coin more 50-penny pieces/-pence pieces* **3** to invent (a word or phrase): *Who coined that word?* **4 coin (the) money (in)** also **coin it (in)**— *infml* to make or earn a lot of money very quickly —**~er** *n*

coin-age /'kɔɪnɪdʒ/ *n* **1** [U] the act of making coins: *Only the government has the right of coinage today.* **2** [U] metal coins in large numbers; CURRENCY (2): *What sort of coinage do they use in France?* **3** [U] the coins made by COINING[2] (2) **4** [C] a word or phrase recently invented: *That's an interesting coinage* **5** [U] the act of inventing new words or phrases

co-in-cide /ˌkəʊɪn'saɪd/ *v* [I∅ (*with*)] **1** to happen at the same time or during the same period of time **2** (of ideas, opinions, etc.) to be in agreement: *My religious beliefs and yours don't coincide*

co-in-ci-dence /kəʊ'msɪdəns/ *n* **1** [C] a combination of events, happening by chance, but in such a way that it seems planned or arranged: *What a coincidence it was to be in London just when you were!* **2** [U] the condition or fact of coinciding (COINCIDE): *Is there any coincidence between his opinions and your own?*

co-in-ci-dent /kəʊ'msɪdənt/ *adj* [Wa5] **1** *tech or fml* existing or happening in the same position and time **2** *fml* having like natures; being in complete agreement

co-in-ci-den-tal /kəʊˌmsɪ'dentl/ *adj* resulting from a COINCIDENCE (1) —**~ly** *adv*

coir /kɔɪə[r]/ *n* [U] a thick hard-wearing material made from the coarse hair that covers the COCONUT (1), used for making ropes, mats, etc.

co-i-tus /'kɔɪtəs, *med* 'kəʊɪtəs/ also **co-i-tion** /kəʊ'ɪʃən/— *n* [U] *med or fml* the act of sex; SEXUAL INTERCOURSE —**coital** /'kɔɪtl, *med* 'kəʊɪtl/ *adj* [Wa5]

coitus in-ter-rup-tus /ˌkɔɪtəs ɪntə'rʌptəs, *med* ˌkəʊɪ-/ *n* [U] *lat & fml* the practice of taking the man's sex organ out of the woman's sex organ before the sex act is completed, to prevent the woman having a baby

coke[1] /kəʊk/ *n* [U] the solid substance that remains after gas has been removed from coal by heating. It is burnt to give great heat, esp. when making steel

coke[2] *v* [T1] to change (coal) into COKE[1]

coke[3] *n* **1** [U] *sl* COCAINE **2** [C;U] *infml tdmk* COCA-COLA

col /kɒl‖kɑl/ *n* a low place between 2 high points in a mountain range, esp. where people, animals, and vehicles can cross the range easily —see picture at MOUNTAIN

col. *written abbrev. for:* COLONEL

col- /kəl, kɒl‖kəl, kɑl/ *prefix* (the form used for CON- before l-): COLLATERAL

co-la /'kəʊlə/ *n* [U] any of several types of non-alcoholic BUBBLY dark-coloured drink

col-an-der /'kʌləndə[r], 'kɒ-‖'kʌ-, 'kɑ-/ also **cullender**— *n* a bowl-shaped pan with many small holes in the bottom, used for separating liquid from food

cold[1] /kəʊld/ *adj* [Wa1] **1** [B] having a low temperature: *a cold day|a cold wind* **2** [B] having a lower temperature than normal: *It's a cold day for July isn't it?* **3** [B] not feeling warm: *I'm very cold today; I should have put a coat on* **4** [F] *infml* (in games) still a long way from finding an object, the answer, etc.: *You're getting colder; you'll never find it* **5** [F] *infml* unconscious; esp. as the result of a severe blow to the head (esp. in the phr. **out cold**): *I knocked him (out) cold with one blow* **6** [B] (of people or their actions) showing a lack of (friendly) feelings; unkind **7** [B] (esp. of a woman) FRIGID (3) **8** [B] (of food) cooked but not eaten hot —see also **cold turkey, have cold feet** (FOOT), **in cold** BLOOD, **to make someone's** BLOOD **run cold** —**~ly** *adv* —**~ness** *n* [U]

cold[2] *n* **1** [*the*+R] the absence of heat; low temperature; cold weather: *It's nice to put on a warm coat and go for a walk in the cold* **2** [C;(U)] an illness, esp. of the nose and/or throat, which is common in winter and may cause headaches, coughing, slight fever, and general discomfort (esp. in the phrs. **catch cold, the common cold**) **3 (out) in the cold** *infml* not considered; seemingly unwanted: *I felt I was out in the cold at the party so I thought I'd come home*

cold[3] *adv infml* completely; thoroughly: *When he asked her to marry him she refused him cold*

cold-blood-ed /ˌ· '·-ˈ/ *adj* **1** [Wa5] having a body temperature that changes according to the temperature of the surroundings: *Snakes are cold-blooded* **2** *derog* showing complete lack of feeling; cruel: *a cold-blooded murder* **3** *infml* being very sensitive to cold: *Joan's cold-blooded: she always feels cold, even with a coat on*

cold chis-el /ˌ· '·-/ *n* a strong narrow sharp-ended steel tool (CHISEL) used for cutting metal

cold com-fort /ˌ· '·-/ *n* [U] something that gives little sympathy or comfort; little CONSOLATION: *My wife is ill in a foreign prison, and it is cold comfort to know that the foreign government may fall in a few years' time*

cold cream /ˌ· '·/ *n* [U] a thick white sweet-smelling oily cream used, esp. by women, for cleaning and smoothing the skin of the face, neck, and hands

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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional)
Application Number 09/978,346	Filed 10/16/2001
For METHOD AND APPARATUS FOR LOW-SPEED, HIGH-THROUGHPUT...	
Art Unit 1732	Examiner LEO B. TENTONI

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$110	$55	$
☒ Two months (37 CFR 1.17(a)(2))	$420	$210	$ 210.00
☐ Three months (37 CFR 1.17(a)(3))	$950	$475	$
☐ Four months (37 CFR 1.17(a)(4))	$1480	$740	$
☐ Five months (37 CFR 1.17(a)(5))	$2010	$1005	$

☒ Applicant claims small entity status. See 37 CFR 1.27.

☒ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☐ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number _____. I have enclosed a duplicate copy of this sheet.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the ☒ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☐ attorney or agent of record. Registration Number _____

☐ attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____

Signature — 07/09/2004 Date

LIOUBOV P. MIASNIKOVA — Typed or printed name

(770)489-6955 Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ Total of 3 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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